Disaster Prepared Policing in India: The Training Paradigms

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Abstract

Disaster preparedness in India's police system is a critical issue that requires a comprehensive evaluation of current training methods. This paper emphasizes the importance of equipping law enforcement officers to respond effectively to disasters, including natural occurrences and human-induced crises. By assessing the police force's current training standards and pinpointing areas for improvement, authorities can ensure that officers are adequately prepared to handle emergencies. This forward-thinking approach not only mitigates the adverse effects of disasters but also safeguards citizens' health and property. With continuous and effective training for law enforcement personnel, India can bolster its disaster management capabilities and improve the overall safety of its communities.

The present paper proposes a techno-conceptual, logical, diagnostic, and investigative framework for disaster preparedness for the police and the development of enforcement professionals in the Indian context. The Ministry of Home Affairs may conduct rigorous research to support continuous HRD for law enforcement professionals and paramilitary forces.

***Key Words*:** Early Warning, Artificial Intelligence, Intelligence-Based System, Disaster Prediction

1. Introduction

Preparing police and law enforcement personnel for potential disasters is vital for ensuring crisis response and management. To cope effectively with critical situations arising from natural disasters, terrorist incidents, and public health emergencies, extensive training, equipment, strategies, and planning are needed. A detailed outline of response strategies and protocols can better equip police officers to handle emergencies effectively. Literature and policy documents support the view that there is a strong disaster-preparedness framework for police and law enforcement officers, including training and interagency collaboration. The preparedness of police officers to confront natural disasters or terrorist attacks is unmatched in the vertical of police duties in India.

However, the state of disaster-prepared policing in India reveals significant challenges as well as opportunities for the next level of improvement. As the first responders to disasters, the local police are hampered by inadequate training and resources. Local police, in addition to civil defence, need to face disaster-response combat [1]. They are "often the first point of contact for victims, necessitating skills in empathy and community engagement" [2]. It is realised that current training programs for police professionals on disaster risk reduction and resilience are stalling due to a lack of comprehensive guidelines and quality-led training programs. Hereby, we recognise the need for regular updates and globally accepted best practices in training modules and programs to enhance disaster preparedness among police in confronting disasters. Although the National Disaster Management Authority has developed a disaster management framework, there remains no state-owned disaster preparedness plan [4]. Such guidelines have yet to ensure resilience against different types of disasters. Considering the looseness of the institutional framework for disaster preparedness, the reaction to a disaster cannot ensure better preparedness through the strategies [3]. Often, the international framework for disaster resilience may not align with the local context [5]. Preparing a disaster responder requires meticulous training [6].

2. Aim and Objectives of Research:

Preparing police officers as disaster-prepared responders requires rigorous support for scrupulous training and continuous learning. As we observe, adequate training is the issue; this paper proposes to delve into training in the context of the state of affairs surrounding unpredictable disasters and the ongoing advancement of technology as future tools. However, to streamline the queries for conception designing, the following objectives are to be accomplished-

i. To establish disaster prospection as a fundamental frame of reference approach;
ii. To highlight the disaster prediction techniques as well as the learning of skills related to disaster preparedness;
iii. To summarize the early warning techniques, tools and technologies' impact on early warning for critical decision-making to combat disasters by the police professionals.

3. Methodology:

To accomplish the objectives, authors need to collect evidence from the literature on disaster and police administration. Given the demand, the desk method of archival searching is the best-fit method for this study. For concept and information collection, a rigorous review was conducted. Whatever little evidence was found on the topic, an exhaustive logical search was later conducted to develop the concept, data, and evidence. Following the standard sequence, the contents were arranged for presentation in concept format.

4. Disaster Preparedness from Prospection for Police:

Prospection is a systematic act of looking ahead and anticipating future events. Prospection is a crucial foundation for anticipating disaster as a future event that offers all-encompassing inputs for the prediction of an occurrence. Prospection is the first step in prediction and preparedness for disasters; a systematic, logical approach can help us prepare for an occurrence using an intuitive model [7]. In disaster preparedness, the police force as a whole operates under the 5Ps, an intuitive framework arranged by the first author of this paper, *Barman. A* to describe a sequential archetype of activities for the public as well as for system safety. The archetype of 4Ps for 5P can be expressed as 4Ps =>P_5, where P5 is an output or a consequence of the interplay of all 4Ps, as all the factors together**.** The symbolic representation of all Ps is-

P_1 is for Prospection.
P_2 is for Prediction.
P_3 is for Preparation.
P_4 is for Prevention; and finally
P_5 is for Protection.

Here, in the context of disaster-ready policing, protection (P_5) is the ultimate goal, achievable through all four Ps (P_1, P_2, P_3, P_4) that precede it.

4. Prospection and Prediction:

The emergence of predictive science seeks to foretell complex environmental phenomena [8]. Prediction of disasters and consequent hazards is a complex and crucial task for

Table: 1
Disaster Prediction Techniques

SL	Techniques	Learning Contents	Skill Contents
1	Mereological Prediction (HP)	Cyclones, Thunderstorms, and Other Weather-Related Disasters	Learn about forecasting; and the role of meteorological data and models in prediction.
2	Hydrological Prediction (HP)	Flood, Drought, and water-related disasters.	Knowing of the use of hydrological models and data.
3	Geological Prediction (GP)	Earthquakes, Landslides, and other Geological hazards.	Techniques for predicting through Data and Models
4	Technological Prediction (TP)	Use of Technology for Disaster Prediction	Remote sensing, Artificial intelligence (AI), and

			understanding the pros and cons of technology application.

Source: Compiled by Author[1]

anyone in the world. Natural disasters such as hurricanes, wildfires, floods, and earthquakes cause massive destruction worldwide each year [9] [14] [15]. Advances in technology and scientific understanding have significantly improved humans' ability to predict natural disasters. Disaster-prepared police officers should be equipped with the basics and, if possible, have enough knowledge of natural disaster prediction to connect and coordinate with the respective agencies to remain prepared to face them. Table 1 is an indicative list for learning and training in natural disaster prediction. Due to the rapid growth of artificial intelligence (AI) applications in natural disaster response, it is projected that the ongoing prediction and detection system will soon become more precise, driven by advanced AI, improved sensors, data collection methods, and analytics [10]. The day has come when police officers must be trained to predict disasters using advanced AI-based predictive analytics.

5. For Early Warning System:

Training is required for the next stage of early-warning dissemination once disaster predictions are confirmed using the specified techniques and technologies. Table-2 describes

Table-2

Training for Early Warning System Development and Implementation

EWS Development	Learning Contents	Skill Contents
(1) Needs Assessment	Knowing how to assess the potential impact of different types of natural disasters.	Identifying specific needs and vulnerabilities.
(2) System Design	Considering factors such as monitoring networks, communication channels, and dissemination strategies.	Skills for Developing a comprehensive early warning system tailored to local needs.
(3) Technology Integration	Ensure compatibility with existing systems and infrastructure.	Knowledge and skills to explore the use of appropriate technologies for data collection, analysis, and dissemination.
(4) Training and Capacity Building	Build capacity within relevant agencies and organizations	Provide training to police professionals on the use of early warning systems
(5) Early Warning Dissemination and Communication	Communication Channels Management	➢ Identify effective communication channels (radio, television, social media, public add systems). ➢ Develop clear and concise messages for diff target audiences.
	Dissemination Strategies	➢ Develop strategies for disseminating warnings to the public and relevant stakeholde ➢ Consider factors such as language, cul differences, and accessibility.
	Public Awareness Campaigns	➢ Conduct public awareness campaigns to edu the public about early warning systems. ➢ Promote understanding of the importance of action and preparedness.
(6) Integrating EWS into Police Operations	Emergency Response Planning	➢ Incorporate early warning information into emergency response plans. ➢ Develop protocols for responding to different types of disasters.
	Resource Allocation	➢ Allocate resources effectively based on early warning information. ➢ Prioritize areas at high risk.
	Community Engagement	➢ Work with communities to disseminate early warnings and promote preparedness. ➢ Foster trust and cooperation between the police and the public.

Source: Compiled by Author[1]

An early warning system with learning and skills content to develop it and integrate it with police administration. As part of local government, the police can use predictive analytics and connected early-detection systems to automate responses across administrative wings and

communities. Thus, natural disaster-prepared policing at the local level can assist by issuing warnings that may trigger mitigation efforts, reducing the damage caused by a natural disaster, especially where training and development for early warning are most effective.

6. Predicting Manmade Disasters:

In 1978, Turner coined the term "Man-Made Disaster" (MMD) to denote a type of disaster previously undistinguished from natural ones [11] [13]. Predicting man-made disasters is a very complex task. Manmade disasters do not bolt from the blue. According to Turner (1997), the precursors of man-made disasters have long incubation periods, and early signals of these incubations are either ignored or misinterpreted [11] [13]. Man-made disasters are, such as Crime, Arson, Civil Disorder, War, Biological/Chemical Threats, Bomb Threats, Terrorist Attacks, suspicious packages and Letters.

Table-3

Tools and Techniques for Predicting Manmade Disasters

Techniques	Learning Contents	Skill Contents
(1) Intelligence Gathering	Open-source intelligence (OSINT)	Collecting information from publicly available sources like social media, news articles, and public records.
	Human intelligence (HUMINT)	Gathering information through human sources, such as informants and undercover agents.
	Signals intelligence (SIGINT)	Intercepting and analyzing communications, such as radio, telephone, and satellite transmissions.
	Geospatial intelligence (GEOINT)	Analyzing geographic information to identify potential threats or vulnerabilities.
	Data mining and analytics	Using advanced techniques to extract patterns and insights from large datasets.
(2) Technology-based Tools	Sensors and surveillance systems	Monitoring critical infrastructure and public areas for signs of potential threats.
	Artificial intelligence (AI)	Using machine learning algorithms to identify anomalies and patterns in data.
	Natural language processing (NLP)	Analyzing text data to identify threats or sentiments.
	Social media monitoring	Tracking social media conversations for signs of unrest or planning.
	Cybersecurity tools	Detecting and preventing cyberattacks that could lead to man-made disasters.
(3) Risk Assessment and Modelling	Risk assessment frameworks	Using standardized methodologies to assess the likelihood and consequences of various threats.
	Scenario planning	Develop hypothetical scenarios to test response plans and identify potential vulnerabilities.
	Vulnerability analysis	Identifying critical infrastructure and assets that are vulnerable to attack.
	Impact assessment	Estimating the potential impact of a disaster on human life, property, and the economy.

Source: Author[1]

Due to the cyber revolution, cybercrimes and attacks such as abuse of information systems, misuse of computer databases, computer network abuse, internet fraud, computer viruses, computer-based crimes, spam, electronic harassment, uncontrolled use of computer data, discriminatory design of information systems, and unauthorised access to computer information systems are destroying the natural human peace and harmony in society [8]. The other types of manmade disasters that may be counted are Haze and Air Pollution (such as Indoor air pollution, Gaseous air pollutants, Urban-industrial air pollution, Particulate Atmospheric Pollution, etc.) [8], which are very difficult to predict. Predicting man-made disasters requires not only better descriptive and qualitative tools but also an

understanding of the complex interplay among human intelligence, advanced technologies, data-gathering tools and techniques, and advanced data analytics.

Prospecting for and predicting artificial disasters and their consequences requires knowledge of advanced tools and techniques. If disaster-prepared policing is an aim in the administrative system, the potential to improve the ability to predict and mitigate the impact of man-made disasters should be pursued only through continuous training, system innovation, and the application of technology by police professionals. Various tools and techniques, along with a brief overview of training contents are explained in Table 3.

7. Early Warning for Man-Made Disaster

Early warning systems for man-made disasters are essential tools for risk preparedness and management of disaster impacts [12]. Such early warning systems help save lives and minimize the potential severity of impacts from a predicted disaster. Police professionals must ensure that the early warning system is effective; it must warrant reliance on the direct participation of risk communities. While doing so, police professionals need to facilitate, educate, and raise public awareness of potential risks. Dissemination of messages and warnings may

Table-4
Intelligence-Based Early Warning System for Manmade Disasters

		Objectives/ Contents	Learning Contents for Prospection and Application	Learning Contents for Delivering Early Warning
Intelligence-Based Early Warning Systems	**(1) Terrorism Threat Assessment Centres**	**Purpose**	Monitor and assess potential terrorist threats, including planning, financing, and recruitment activities.	Provide early warnings to law enforcement and other relevant agencies about potential terrorist attacks.
		Methods	Utilize a variety of intelligence sources, e.g., human intelligence (HUMINT), signals intelligence (SIGINT), and open-source intelligence (OSINT).	
	(2) Cyber Threat Intelligence Centres	**Purpose**	Monitor and assess potential cyber threats, such as hacking, malware attacks, and data breaches.	Provide early warnings to organisations and critical infrastructure about potential cyberattacks.
		Methods	Utilise a variety of intelligence sources, including network traffic analysis, threat intelligence feeds, and vulnerability assessments.	
	(3) Industrial Espionage Monitoring Centres	**Purpose**	Monitor and assess potential industrial espionage activities, such as theft of intellectual property and trade secrets.	Provide early warnings to businesses and government agencies about potential industrial espionage threats.
		Methods	Utilize a variety of intelligence sources, including open-source intelligence, human intelligence, and technical surveillance.	
	(4) Disinformation Monitor	**Purpose**	Monitor and assess potential disinformation campaigns, such as the spread of false information or propaganda.	

		Methods	Utilize a variety of intelligence sources, including social media monitoring, content analysis, and fact-checking.	Provide early warnings to the public and government agencies about potential disinformation threats.
	(5) Crisis Management Centre's	**Purpose**	Monitor and assess potential crises, such as civil unrest, natural disasters, or public health emergencies.	Provide early warnings to government agencies and emergency responders about potential crises.
		Methods	Utilize a variety of intelligence sources, including social media monitoring, news analysis, and field reports.	

Source: Author[1]

help the vulnerable people maintain a constant state of preparedness to ensure early action and response to artificial disasters. Police officers need to adopt an early warning system. In adopting an early warning system, police officials need adequate training to implement an intelligence-based system for responding to artificial disasters, as explained in Table 4.

8. Deploying the Training and Development:

Training and development interventions for disaster-prepared policing are not simple, one-shot tasks for the department and administration. It is a multifaceted and multifarious function and should be continuous. Streamlining disaster predictions and early warnings to prepare police professionals for natural and artificial disasters may require clarity on the disaster via its prediction and point of emergence, and the severity and spread of impacts. Artificial intelligence may be very helpful in these application areas. For early warning of disasters, policy professionals should have detailed knowledge of risk, i.e., hazards and vulnerabilities in priority areas. Knowledge of monitoring, Response capability development, and warning communication automatically becomes a critical activity in real-world applications. Any disaster is considered a wicked problem that needs many wicked solutions. To train to face such wicked problems, the simplified modules stated above can be used. Tables 1, 2, 3, and 4 above indicate the complexity of the contents and the simplicity of understanding the solutions in the future. Here lies the importance of continuous training and development efforts by agencies, the state, and the country.

9. Future Research:

Something very fundamental to planning for and anticipating natural and artificial disasters is predictive analytics. In policing, the question of how to apply predictive analytics and early warning systems is essential to helping officers utilise continuous data processing and update their plans of action. This is believed to enhance the ability to predict disasters and other related eventualities that are most likely to occur shortly. These early responses will enable response teams to take necessary actions and implement restrictions during natural and artificial disasters.

Disaster preparedness in policing and preparing the police to face disasters is a grey area for future research. Based on the training needs assessment, the technology readiness, acquisition, adoption, and implementation of technology for disaster readiness among police and para-security professionals require deep and exhaustive research. This work may contribute significantly to police-related training and HRD in the future.

10. Conclusion:

Prospection, prediction, preparation, prevention, and protection remain highly important for the safety of the public and systems. Prospection is the preliminary stage of risk management hence making it one of the most crucial stages since it feeds into the prediction stage. In disaster preparedness, the five Ps of protection serve as a comprehensive model. According to this analytic approach, assessing

future operations for safety and security is considered highly critical. Disaster preparedness and the participation of the police and other law enforcement agencies are measures that can prevent such major tragedies. Only in India, due to many other special circumstances, has it geared up advanced Training initiatives, synergy, and proactive implementation of predictive analytics to replenish and build a stronger base of first responders in such crises.

References

[1] I, B., Shaik, N. (2022). Training Programs for Police in Disaster Risk Reduction. In: Singh, A. (eds) International Handbook of Disaster Research. Springer, Singapore. https://doi.org/10.1007/978-981-16-8800-3_164-1

[2] Haberfeld, M., Grutman (Chmelev), M., Herrmann, C.R. (2023). India. In: Policing Crisis Situations. Springer Briefs in Criminology. Springer, Cham. https://doi.org/10.1007/978-3-031-22909-1_5

[3] Dr L Malleswara Rao, J Rama Mohan. (2020). 3. Disaster Management in India: prevention, mitigation & preparedness. Journal of Emerging Technologies and Innovative Research, www.jetir.org), ISSN:2349-5162, Vol. 7, Issue 8, page no.27-33, August 2020, Available at URL http://www.jetir.org/papers/JETIREF06005.pdf

[4] A., J., Shah. (2011). 4. An Overview Of Disaster Management In India. WIT Transactions on the Built Environment, doi: 10.2495/DMAN110081

[5] Shalini, Narayanan. (2022). 5. Government Information Dissemination Structures and Processes in Disasters. International Handbook of Disaster Research, doi: 10.1007/978-981-16-8800-3_99-1

[6] Benjamin, Kaufman, Bryan, Jarrett, Pia, Daniel, Joseph, Freedman, Christina, Bloem, Bonnie, Arquilla. (2019). 6. Simulating a disaster: Preparing responders in India. Doi: 10.4103/IJAM.IJAM_28_18

[7] Kappi, M., Mallikarjuna, B. Artificial intelligence and machine learning for disaster prediction: a scientometric analysis of highly cited papers. Nat Hazards (2024). https://doi.org/10.1007/s11069-024-06616-y

[8] UIA, at URL http://encyclopedia.uia.org/en/strategy/208120 (Browsed on 16/09/2024).

[9] Saiwa ai (Mon Sep 18, 2023), AI and Natural Disaster Prediction | All You Need to Know; at URL https://saiwa.ai/blog/ai-and-natural-disaster-prediction/

[10] Glair.Ai (June 2022), How AI Predictive Analysis Detect Natural Disaster; https://glair.ai/post/how-ai-predictive-analysis-detect-natural-disaster, (Browsed on 16/09/2022)

[11] B. A. Turner, N. E. Pidgeon, Man-made Disasters, Butterworth- Heinemann, Oxford, 1997. (from Review) https://www.theisrm.org/public-library/Review%20of%20Man-Made%20Disasters.pdf (Browsed on 16/09/2024)

[12] Kovalevsky. V.; Early Warning Systems; in the URL https://preparecenter.org/topic/early-warning-systems/ (Browsed on 16/09/2024)

[13] https://www.theisrm.org/

[14] Saiwa ai (Mon Sep 18, 2023), AI and Natural Disaster Prediction | All You Need to Know; at URL https://saiwa.ai/blog/ai-and-natural-disaster-prediction/

[15] Corrigan, M., MacDonald, N., Musselman, M. E., Pinto, J. A., Skildum, M., & Smith, A. P. (2022). ASHP Statement on the Role of the Pharmacy Workforce in Emergency Preparedness. American Journal of Health-System Pharmacy. https://doi.org/10.1093/ajhp/zxac226

[16] Hill, V. C. The Industrial Fatality in Post-Robens Britain, 1974 – 2014. https://doi.org/10.7190/shu-thesis-00624

[16] Miranda, C. (2023). Security framework for software-defined wireless networks. https://core.ac.uk/download/642834242.pdf

[17] Zulkarnain, J., Mulya, R. F., Pratiwi, T., Pangestuti, W., & Ilmawati, F. I. (2022). DevOps Main Area and Core Capabilities: Adopting DevOps in the Last Decade: A Systematic Literature Review. https://doi.org/10.34010/injuratech.v2i2.8364

[18] Luo, G., Tao, M., Wu, B., Zhang, M., Zhong, S., Zhong, S., Li, J., & Yang, X. (2024). Cost Estimation for the Operation and Maintenance of Automated Monitoring and Early-Warning Equipment for Geological Hazards: Sustainability, 16(23), 10505.

[18] Zontek, Z., & Lipianin-Zontek, E. (2024). Knowledge Management in Social Organisations During a Humanitarian Crisis. European Conference on Knowledge Management, (), 959-966.

[19] Almadani, B., Alissa, S., Alshareef, R., Aliyu, F., Aliyu, F., & Al-Nahari, E. (2024). A Survey of Middleware Adoption in Nonprofit Sectors: A Sustainable Development Perspective. Sustainability, 16(20), 8904.

[20] Sprigg, W. A. (2016). Dust Storms, Human Health and a Global Early Warning System. Extreme Weather and Society. https://doi.org/10.1007/978-3-319-30626-1_4

[21] Sprigg, W. A. (2016). Dust Storms, Human Health and a Global Early Warning System. Extreme Weather and Society. https://doi.org/10.1007/978-3-319-30626-1_4

[22] Corrigan, M., MacDonald, N., Musselman, M. E., Pinto, J. A., Skildum, M., & Smith, A. P. (2022). ASHP Statement on the Role of the Pharmacy Workforce in Emergency Preparedness. American Journal of Health-System Pharmacy. https://doi.org/10.1093/ajhp/zxac226